IN THE SPECIFICATION:

Please amend paragraph [0003], as follows:

--In recent years, cellular phones and personal digital assistants (PDAs) have been more and more widely used drastically, and equipment with smaller size, lighter weight and higher performance is ~~being~~ desired. However, operation speed and integration of electronic circuit boards increase as the size and weight of equipment are reduced and the performance of equipment is enhanced. Accordingly, appropriate and prompt measures are strongly needed to cope with malfunctions of equipment due to signal delay and electromagnetic interference (EMI). In such a situation, the optical circuit or interconnection is expected to radically solve the above technical problems. The optical circuit or interconnection can reduce the EMI radiated from the wiring, and can transmit optical information at high speed.--

Please amend paragraph [0004], as follows:

--Japanese Patent Application Laid-Open No. 9(1997)-96746 discloses the following optical circuit board which makes use of the technical advantage of the optical wiring. In this optical circuit board, an optical wiring portion and an electronic wiring portion are separated from each other, optical switches or optical modulators provided on the board are driven by a voltage signal supplied from electronic equipment, and light propagating through optical waveguides provided on the substrate is modulated. The~~, the~~ electrical signal is thus converted into an optical signal, and transmitted. The~~, the~~ thus-transmitted optical signal is again converted into an electrical signal by a light-receiving ~~light receiving~~ device provided on the board, or another board, and the signal is transmitted to another piece of electronic equipment, or the same electronic equipment. In this construction, the electronic wiring is partly replaced by

the optical wiring, but places for executing electrical/optical (EO) signal conversion or optical/electrical (OE) signal conversion are limited since the optical wiring path is comprised of a transmission line (i.e., a line-shaped linear polymer waveguide).--

Please amend paragraph [0010], as follows:

--The relaying unit can include a light diffusing structure capable of diffusing a light beam propagating in the form of a beam toward all 360-degree ~~all~~ directions, or toward directions of a predetermined angular range in the optical waveguide. In this case, the light diffusing structure is a minute structure having a thickness less than a thickness of a core layer of the optical waveguide, for example (see Fig. 1, etc.). As disclosed herein, the core layer is a layer of a relatively high refractive index in which light propagates. Alternatively, the relaying unit can include a reflective structure capable of changing the propagation direction of a light beam propagating in the form of a beam while ~~with~~ maintaining the beam form (see Fig. 6, etc.).--

Please amend paragraph [0012], as follows:

--The relaying unit can include an optical ~~a optical~~ structure, such as a grating, a hologram, a roughed-surface structure, and a minute-protrusion structure, capable of changing a propagation condition of light propagating in the optical waveguide in a passive manner. The passive manner is a manner in which the optical signal is not processed in a regenerative manner by amplification, shaping, etc. Alternatively, the relaying unit can include a light receiving device for receiving the propagating light to convert it into an electrical signal (O/E conversion), and a light emitting device for reconverting ~~reconvert~~ the electrical signal obtained by the O/E

conversion into another optical signal (E/O conversion) such that a propagation condition of light propagating in the optical waveguide can be actively changed. The active manner is a manner in which the optical signal is processed in a regenerative manner by amplification, shaping, etc. Those relaying units can be selectively employed as occasion demands.--

Please amend paragraph [0013], as follows:

--The optical waveguide can have a structure in which a sheet-shaped core layer is sandwiched by a first cladding layer and a second cladding layer. As disclosed herein, the cladding layer is a layer of a relatively low refractive index adjacent to a layer of a relatively high refractive index. At least one of a light emitting device in the light transmitting unit and a light receiving device in the light receiving unit is typically arranged on a surface of the optical waveguide, or in the optical waveguide though arrangement locations thereof are not restricted.--

Please amend paragraph [0017], as follows:

--The following more specific structures are possible. Plural vias can be formed in the optical waveguide apparatus. The via penetrates the optical waveguide apparatus such that electronic circuit layers sandwiching the optical waveguide apparatus can be electrically connected to each other. Serial optical signals, ~~signal~~ can be transmitted in the optical waveguide apparatus in a construction in which the electronic circuit layer includes parallel signal lines, output terminals of the parallel signal lines are connected to the spherical light emitting device, and the electronic device integrally formed in the spherical light emitting device performs parallel/serial conversion. In this case, parallel electrical signals can be transmitted to an electronic device, when the serial optical signal is received by the spherical light receiving device

formed ~~filled~~ in the optical waveguide apparatus, and the electronic device integrally formed in the spherical light receiving device performs serial/parallel conversion.--

Please amend paragraph [0018], as follows:

--In the electronic circuit layer, a plurality of optical through-holes ~~though-holes~~ penetrating the electronic circuit layer can be formed such that optical signals can be transmitted between two-dimensional optical waveguide apparatuses. The optical through-hole can be filled with the same material as that of the core layer of the two-dimensional waveguide layer apparatus, but the material is not limited thereto. The inner portion of the optical through-hole can be ~~an~~ air without using any material, or an optical fiber or a lens can be inserted into the inner portion of the optical through-hole.--

Please amend paragraph [0049], as follows:

--Fig. 4 illustrates an opto-electronic hybrid circuit board which is fabricated by combining the above-discussed two-dimensional optical waveguide apparatus with an electronic circuit board. In Fig. 4, reference numeral 400 designates a central processing unit (CPU). Reference numerals 402 and 404 designate random access memories (RAMs), respectively. Reference numeral 406 designates an electronic device other than ~~those~~ the CPU and RAM. Reference numeral 408 designates an electrical transmission line. Reference numeral 410 designates a light emitting device. Reference numeral 412 designates a light receiving device. Reference numeral 414 designates a light diffusing structure. Reference numeral 416 designates a light beam, and reference numeral 418 designates diffused light.--

Please amend paragraph [0051], as follows:

--In the opto-electronic hybrid circuit board of Fig. 4, parallel/serial conversion is executed at the last stage of the CPU 400, and a single semiconductor laser 410 connected to the CPU 400 is used to convert an electrical signal to an optical signal, in contrast to the conventional electronic circuit which needs multiple transmission lines. This semiconductor laser 410 is filled in the two-dimensional optical waveguide apparatus such that the light beam 416 therefrom can propagate in the two-dimensional optical waveguide apparatus with a high directivity, and the light beam is diffused by the light diffusing structure 414 in ~~on the way of~~ its optical path. The diffused light 418 spreads overall the two-dimensional optical waveguide, and the optical signal is received by the light receiving device 412 placed at any desired location. The light receiving device 412 is electrically connected to the RAM 404, and the optical signal is converted into an electrical signal thereby. This electrical signal is then serial/parallel converted to the parallel signal with 64-bit wide.--

Please amend paragraph [0061], as follows:

--Fig. 7 illustrates a cross-section ~~cross section~~ of an opto-electronic hybrid circuit board of a fourth embodiment in which a plurality of optical circuit layers are used. In Fig. 7, reference numeral 700 designates a CPU. Reference numeral 702 designates a RAM. Reference numeral 704 designates a light emitting device. Reference numeral 706 designates a light receiving device. Reference numeral 708 designates a via. Reference numeral 710 designates an electronic circuit layer. Reference numeral 712 designates an optical circuit layer. Reference numeral 714 designates an electronic device.--

Please amend paragraph [0070], as follows:

--Fig. 11A illustrates an opto-electronic hybrid circuit board which is fabricated by combining the above-discussed ~~above discussed~~ two-dimensional optical waveguide apparatus with an electronic circuit board. Fig. 11B illustrates the neighborhood of a portion for emitting an optical signal. In Figs. 11A and 11B, reference numeral 1800 designates a CPU. Reference numerals 1802 and 1804 designate RAMs, respectively. Reference numeral 1806 designates an electronic device other than those CPU and RAM. Reference numeral 1808 designates an electrical transmission line. Reference numeral 1810 designates a light emitting device. Reference numeral 1812 designates a light receiving device. Reference numeral 1814 designates a light diffusing structure. Reference numeral 1816 designates a light beam, and reference numeral 1818 designates diffused light. Reference numeral 1820 designates a first optical-path converting structure.--

Please amend paragraph [0079], as follows:

--Further, Fig. 15 illustrates a cross-section ~~cross-section~~ of a similar two-dimensional optical waveguide apparatus of a modification of the seventh embodiment in which a spherical light emitting device with an electronic device integrally formed on its surface and a spherical light receiving device with an electronic device integrally formed on its surface are arranged in the two-dimensional optical waveguide. In Fig. 15, reference numeral 2200 designates a first cladding layer. Reference numeral 2202 designates a core layer. Reference numeral 2204 designates a second cladding layer. Reference numeral 2206 designates a light diffusing structure. Reference numeral 2208 designates a spherical light emitting device. Reference numeral 2210 designates a spherical light receiving device. The spherical light

receiving device 2210 formed ~~filled~~ in the two-dimensional optical waveguide can ~~be~~ effectively receive an optical signal transmitted in the optical waveguide without using the optical-path converting structure, or the like.--

Please amend paragraph [0086], as follows:

--Fig. 16 illustrates a cross-section ~~cross section~~ of an opto-electronic hybrid circuit board of an eighth embodiment which includes two optical circuit layers connected through an optical through-hole. In Fig. 16, reference numeral 2900 designates a CPU. Reference numeral 2902 designates a RAM. Reference numeral 2904 designates a light emitting device. Reference numeral 2906 designates a light receiving device. Reference numeral 2908 designates a via. Reference numeral 2910 designates an electronic circuit layer. Reference numeral 2912 designates an optical circuit layer. Reference numeral 2914 designates an electronic device. Reference numeral 2916 designates an optical-path converting structure. Reference numeral 2918 designates an optical through-hole.--

Please amend paragraph [0090], as follows:

--Further, although the optical through-hole 2918 is filled with the same material as that of the core layer of the two-dimensional optical waveguide layer in this embodiment, the material is not limited thereto. The inner portion of the optical through-hole 2918 can be ~~an~~ air without using any material, or an optical fiber or a lens can be inserted into the inner portion of the optical through-hole 2918, for example.--

Please amend paragraph [0091], as follows:

--Fig. 17 illustrates a cross-section ~~cross section~~ of an opto-electronic hybrid circuit board of a ninth embodiment which includes two optical circuit layers connected through an optical through-hole. In Fig. 17, reference numeral 4000 designates a CPU. Reference numeral 4002 designates a RAM. Reference numeral 4004 designates a light emitting device. Reference numeral 4006 designates a light receiving device. Reference numeral 4008 designates a via. Reference numeral 4010 designates an electronic circuit layer. Reference numeral 4012 designates an optical circuit layer. Reference numeral 4014 designates an electronic device. Reference numeral 4016 designates an optical-path converting structure. Reference numeral 4018 designates a light diffusing structure. Reference numeral 4020 designates an optical through-hole.--